

DECLASSIFIED E.O. 12598 SEC. 3.5
OPNAVINST 5513.16A APR 08 1996

M-13

0-15 (1923)
(953)

20 SEP 1949

~~CONFIDENTIAL~~

From: Commander, San Francisco Naval Shipyard
To: Chief of Naval Operations (CNO)
Via: (1) Commander, Mare Island Naval Shipyard
(2) Commandant, Puget Sound Naval Yard (SSNB)
(3) Chief, Bureau of Aeronautics (NSA)
(4) Chief, Bureau of Ships (Code 25)
(5) Chief, Bureau of Yards and Docks (Code P-314)

Subj: Engineering Test Equipment (Hot Cell) for the Naval Radiological Defense Laboratory; request for approval of

Refs: (a) CNO(SSB) ltr Op (1503-1b) Serial 77722415 of 17 Jan 1947
(b) CNO ltr Serial 1305/1610/CPK of 14 Oct 1947

Encls: (A) SWS Project #17140 Construction of Bldg. 351 to RRL
(B) Position and Layout Sketch for Subject Equipment
(C) SWS ltr 53/AL(38804) (440) of 25 July 1949
(D) SWS conf serial 110-5(1)/RD(12-171) Serial 01365 of 8 July 1949
(E) Encls conf ltr 107-12-54 Serial 07750 of 15 Aug 1949

1. It is proposed to build engineering test equipment at the Naval Radiological Defense Laboratory (NRDL) capable of handling large highly radioactive samples which will be used to test the efficiency of decontamination methods. Preliminary talks were held with representatives of the Bureau of Aeronautics and primary planning was initiated jointly by the above Bureau and the NRDL. As a result of this planning it was found that because of the stringent rules governing the exposure of personnel to radiation hazard the proposed equipment could not be incorporated into any facility either presently available or planned in the future by the NRDL. The shielding requirements for the equipment involve a completely enclosed outer area to control any airborne hazard and an inner heavily shielded area to keep the direct radiation hazard at minimum allowable limits. With the above requirements in mind the following sub-paragraphs describe and justify the suggested project:

(a) ~~Encls 1-5~~ Hot Cell equipment for the Naval Radiological Defense Laboratory.

DECLASSIFIED E.O. 12598 SEC. 3.5
OPNAVINST 5513.16A APR 08 1996

C-L5(00923)
(953)

(b) Estimated Cost

\$95,000 based on fiscal year 1950 estimated costs. Money now authorized and available in Naval Working Fund Special Allotment #91482, Enclosure (D), and to be expended in accordance with Enclosure (E).

(c) Purpose and Justification

One of the major problems in the continued operation of military equipment in the event of attack by atomic weapons is the decontamination of surfaces which have been subjected to contamination by radioactive materials. The scientific and technical aspects of this problem have been under continued study at the Naval Radiological Defense Laboratory. These studies have been made on small samples or on larger samples using tracer levels of radioactivity. Progress has been substantial and the next stage of development, the pilot plant scale, is now indicated. It is proposed therefore, to build a piece of equipment which will be capable of handling large, highly radioactive samples upon which laboratory results may be tested and/or developed on a scale more compatible with that obtaining in the field. The need for intermediate or "pilot plant" scale engineering test equipment has been apparent in nearly all studies which involve adapting laboratory results for final use in the field. The use of the so-called "pilot plant" as an intermediate step between the laboratory and the full scale operations in the chemical industry is an excellent example. The Naval Radiological Defense Laboratory has now arrived at a position where an engineering test cell for comparatively large, highly radioactive samples has become a necessity for the following reasons:

- (1) It is impractical for reasons of expense, time and safety to conduct continuous radiological engineering tests of the desired type in the field.
- (2) Surface configuration is a major factor in decontamination and this factor cannot be taken into account in the laboratory alone.
- (3) The present facilities of the Naval Radiological Defense Laboratory are insufficient to handle more than 100 millicuries of gamma emitters

DECLASSIFIED E.O. 12598 SEC. 3.5
OPNAVINST 5513.16A APR 08 1996

C-15(00923)
(953)

~~CONFIDENTIAL~~

in safely controlled areas. For realistic results on decontamination methods and procedures it is necessary to use about 10 curies of activity. Further, the new facilities planned under SPNS Project 12D40, enclosure (A), do not include an Engineering "Hot" Cell, nor will the equipment described here duplicate any equipment already proposed by NRL.

(4) Under the present conditions ((3) above) highly contaminated samples must be restricted to a few square inches in area; this size is completely insufficient to give meaningful field scale results.

(5) The testing of models is not sufficient because there are no known scale factors which will enable the results of a model test to be applied to a full scale case.

(6) Meaningful results can only be obtained by testing representative sections of full scale equipment, i.e., A/C landing wheel and strut, section of ships radar antenna, shore base equipment, etc.

(7) Use of tracer amounts of radioactivity rather than high level radioactivity in full scale testing is not practical since the high decontamination factors required (10^4) in a good method would leave undetectable amounts of radioactivity left on the surface and hence would allow no quantitative evaluation of the procedure or method.

The primary justification for an engineering test cell contained in paragraphs (1) through (7) above can be supplemented by the following secondary purposes for which this equipment may be used.

(1) Studies of health hazards to be expected in field decontamination of equipment and surfaces at levels approaching those to be anticipated under actual operational or tactical conditions.

(2) Correlation of readings of instruments when measuring contamination of large and complicated areas with actual contamination present and determination of errors introduced by calibration from a point source.

- 3 -

DECLASSIFIED E.O. 12598 SEC. 3.5
OPNAVINST 5513.16A APR 08 1996

C-13(00923)
(953)

~~CONFIDENTIAL~~

(3) Recovery of radioactive materials for reuse when these materials have been mixed with foreign matter either in use or by accident. This requirement would occur when solutions of 1 curie or more are involved as these cannot be handled in present laboratories.

(4) "Milking operations" to obtain short half-life daughters of long-lived fission products, thus avoiding the problem of attempting to ship the short half-life isotopes which is difficult at best.

(5) Concentration of dilute radioactive waste by precipitation or precipitation-filtration to recover plutonium for which the laboratory is strictly accountable or to avoid handling of large masses of radioactive waste solutions as a necessary prelude to safe disposal.

(6) Extraction from the gross fission product solutions of desired quantities of specific radioisotopes which are not available from Oak Ridge. This problem has already been encountered in the case of tellurium, for example.

(7) Operations involving safe transfer of high activity samples from shipping containers into specific receptacles for encapsulation or use in low activity laboratories. As an example, when the projected cobalt irradiation source becomes available it will be necessary to handle a large number of Co^{60} capsules each of which will be 25 curies.

(d) Description

This project consists of a ventilated, 46' x 42' x 25' structure within which will be located a heavily shielded (concrete) 8' x 8' x 12' engineering decontamination cell, an overhead 3-ton crane to service the cell, a simple laboratory hood for handling radioactive materials, portable air conditioning and refrigeration equipment and a manual decontamination hood. The entire project is to be designed in such a manner as to be easily adapted

- 4 -

DECLASSIFIED E.O. 12598 SEC. 3.5
OPNAVINST 5513.16A APR 08 1996

C-15(00923)
(953)

~~CONFIDENTIAL~~

for attachment to the proposed new wing extension to Bldg. 351 described by enclosure (A), Project Identification Number 12ND40. Radioactive drains and disposal units will be combined with those planned for the Bldg. 351 Annex insofar as practicable. Position and Layout Sketch is included as enclosure (B).

(e) Supporting Data

The estimated cost of this project is as follows:

Tanks - Contamination - Decontamination	\$7,00
Tanks - Other	3,00
Blowers and Filters	5,00
Pumps and Jets	1,00
Heaters and Coolers	1,00
Refrigeration and Air Conditioning Equip.	4,00
Ducts and Pipes	3,00
Services - Steam, Gas, Elect., Air, Lab. Furn.	5,00
Periscope	3,00
Hot Hood	8,00
Doors, Hatches, etc.	2,00
Concrete Structure and Shields	28,00
Excavation	5,00
Foundation	10,00
	\$85,00
Plans and Specifications (see (g) below)	
Contingency	10,00
Total	\$95,00

(f) Previous Action

None

(g) Remarks

Plans and specifications are to be accomplished under the terms established by enclosure (C) for Project #12ND40. The construction of this equipment is to be done by contract.

2. Inasmuch as funds are already available and therefore not dependent upon further Congressional action, this project is being submitted separately from the Fiscal Year 1952 Shore Station Development Program. This is in accordance with paragraph 5A(a) of reference (b).

3. It is requested that approval be granted for the construction of the subject equipment. In view of the urgent need for this equipment it is further requested that this activity be notified by dispatch of the action taken by the addressees.

CC: ComSanFrantNavBase ✓
R&D3, Committee on Atomic
Energy
O.N.R. (attn: Dr. T. J. Killian) ✓

B. E. MANSEAU

03. 4
9-11
7-3

DECLASSIFIED E.O. 12598 SEC. 3.5
OPNAVINST 5513.16A APR 08 1996

FULLY DETAILED DESCRIPTION AND JUSTIFICATION

FISCAL YEAR _____

SECTION _____ 12TH NAVAL DISTRICT

CLASS _____

Project Identification Number

12ND40

District Priority

SAN FRANCISCO NAVAL SHIPYARD

Project Title

Conversion of Building No. 351 to Naval Radiological Defense Laboratory

Estimated Cost

\$1,034,500 based on fiscal year 1951 estimated costs.

(A) Purpose and Justification

The purpose of this project is to convert all floors and make additions to Building No. 351 for use of the Naval Radiological Defense Laboratory. At the present time this activity is housed in temporary wooden buildings which are much too small for the purpose, and subject to the usual fire hazards. The laboratory will not be at all effective to the extent necessary until the move into Building No. 351 is consummated.

The requirements and facilities of the Naval Radiological Defense Laboratory have been the subject of close study and planning for the past 18 months. The laboratory has been in the stage of development during this period as the field of research which it will be called upon to explore has become more fixed and, through firmer concepts of the work to be performed better ideas of the facilities required have been obtained. Much information has been obtained on facility requirements by inspection and study of work being carried on by other research centers. As a result of this study it is believed that the following precepts should be established:

- (a) The chemistry section of the Radiological Laboratory as now established Building 506 to be considered adequate for the requirements of this section for the next five years.
- (b) The conversion of Building 351 as shown will provide only the minimum space necessary for the various activities of the Radiological Laboratory exclusive of the chemistry section.

It is therefore now recommended that the activities of chemistry section of the subject project not be moved to Building 351. This will (a) greatly simplify the reconstruction problems involved in making

ENCLOSURE (A)

DECLASSIFIED E.O. 12598 SEC. 3.5
OPNAVINST 5513.16A APR 08 1996

provision for such laboratories in Building 351 and thus speed the reconstruction; (b) provide more space for other activities which previously did not have sufficient space; (c) allow for immediate planning for a gamma ray source and Van de Graaf building on the site previously planned for the Hot Laboratory. It is believed preferable to have the Chemistry Section occupy Building 506 where it is now established for the next five years in order to release necessary space to other activities of the laboratory, speed the conversion of Building 351 and plan on occupying future laboratories more suited to radio chemistry in accordance with developing needs of the program than can be constructed in Building 351. This would increase maximum utilization of the present investment in Chemistry Laboratory facilities in Building 506 until the ultimate radio-chemical program requirements have crystallized.

The use of Building 351 would provide fireproof space for a convenient and efficient Radiological Laboratory. The temporary wooden building now used by this activity would be retained for storage space and the continued use by the Chemistry Section as explained above.

(B) Description

This project consists of the construction of a new wing extension to Building 351; revision and additions to all four floors; mezzanine addition to make a fifth floor; conversion of freight elevator to passenger service, and enclosing entire area around building with a security fence, as shown on P.W. Dwg. 16147-18 accompanying this report as enclosure (D). This project will be centrally located, as shown on the proposed Shipyard development plan.

(C) Supervision data

The quantities and estimated cost of the construction and collateral are as follows:

I.	(a) Architectural and structural	\$340,196
	(b) Electrical	93,175
	(c) Mechanical	112,308
		\$545,679
	10% Contingency	54,568
		600,247
	A&E Fee 6%	36,015
	Total Construction Cost	636,262
II.	Collateral (BuShips)	447,978
	TOTAL	\$1,084,240

ENCLOSURE (A)

DECLASSIFIED E.O. 12598 SEC. 3.5
OPNAVINST 5513.16A APR 08 1996

(D) Current Directives Construction will comply with current directives and policies governing public works construction.

(E) Previous action Earlier projects proposed the use of Building No. 351 as a Training School and Industrial Laboratory.

First request as project 12ND40 for fiscal year 1949 at estimated cost of \$225,000 with Industrial Laboratory on first and second floors and Radiological Laboratory on third and fourth floors and messmaine. By Conf. BuShips letter Code 160 NY9-1 dated 18 November 1946 to ComNavShipEd SanFran, it is directed that the present laboratory facilities at the SFNS be increase to carry out the functions enumerated therein. In order to execute these instructions, it has been determined that the entire Building 351 should be converted, extended and equipped for a Radiation Laboratory.

Second request as New Facilities Project for Conversion of Building 351 to Radiation Laboratory, estimated cost of \$834,500 by SFNS ltr NB(40613)(444) dated 9 June 1947 restricted to BuDocks.

Included as priority 13-A in CND Priority List BuShips 1949 projects at an estimated cost of \$633,000.

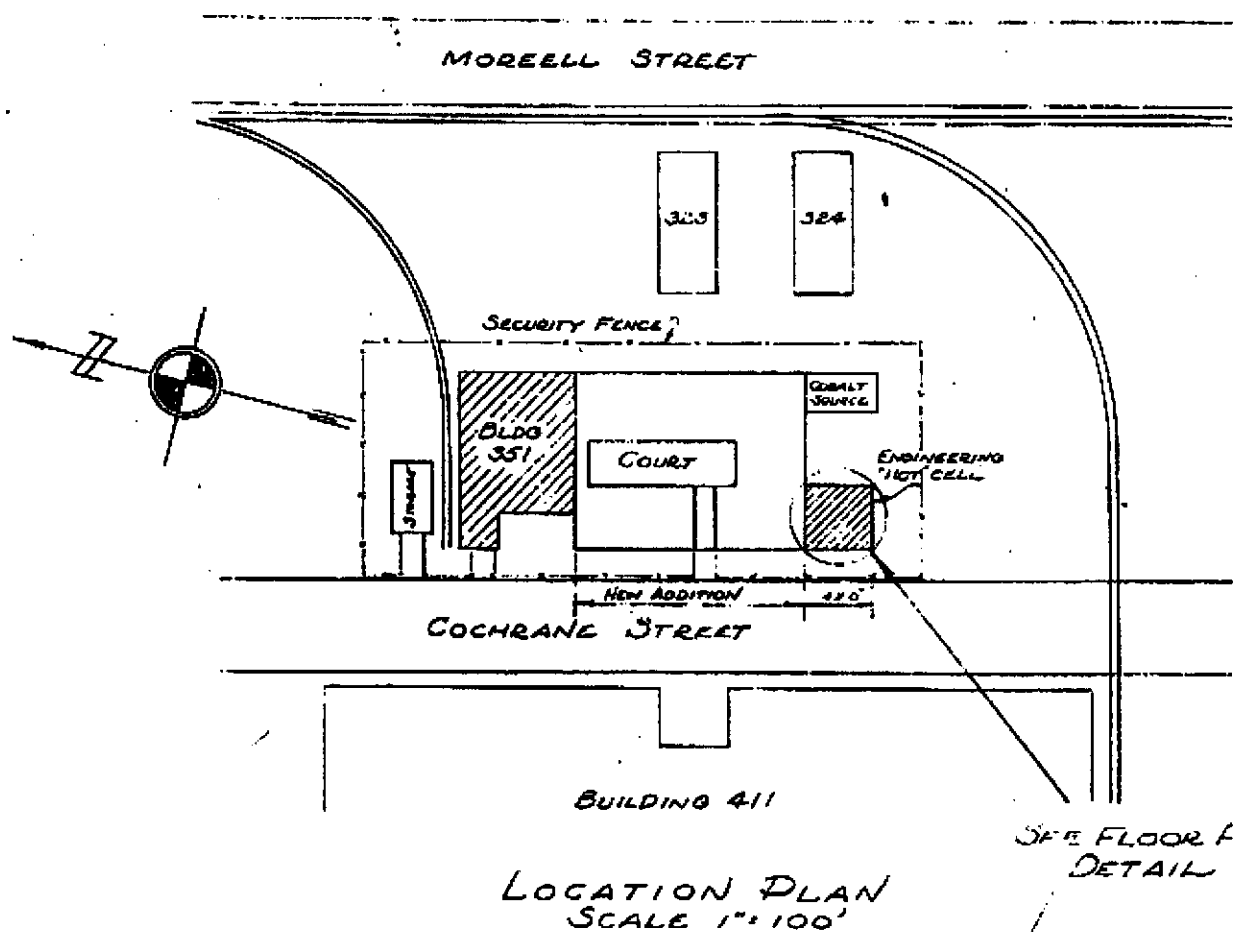
Third Request as project 12ND-40, Local Station Development Program for the fiscal year 1950 at an estimated cost of \$695,200.

Fourth request as New Facilities Project for Conversion of Building No. 351 to Naval Radiological Defense Laboratory, estimated cost of \$1,084,500 by SFNS ltr A1(54879)(441) dated 13 August 1948, restricted, to BuDocks and BuShips revising previous submissions.

(F) Remarks It is proposed to accomplish this work by contract.

ENCLOSURE (A)

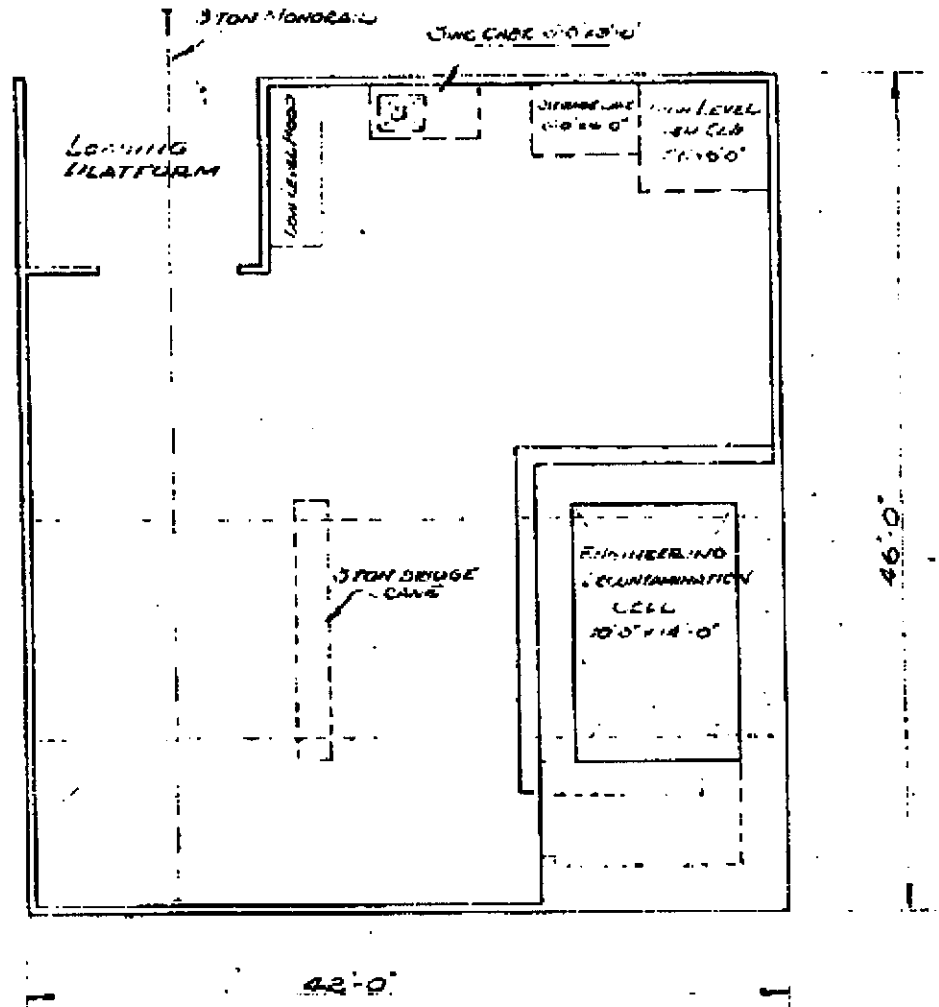
DECLASSIFIED E.O. 12958 SEC. 3.5
OPNAVINST 5513.16A APR 08 1996



LOCATION PLAN
SCALE 1"=100'

~~CONFIDENTIAL~~

DECLASSIFIED E.O. 12958 SAL-3.3
OPNAVINST 5513.16A APR 08 1996



FLOOR PLAN - "HOT" CELL
Scale: $\frac{1}{8}" = 1'-0"$

BNC